Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 1, 4-13, 17, and 19-64 are pending in the application, with 1, 13, and 33 being the independent claims. Claims 16 and 18 are sought to be cancelled, claims 63 and 64 are sought to be added, and claims 1, 13, 33-35, 59, and 60 are sought to be amended. New claims 63 and 64 are merely cancelled claims 16 and 18 renumbered to depend from a preceding claim. Support for the amendments to the claims can be found, *inter alia*, throughout the specification and in the claims as originally filed. In particular, support for the amendment to claims 1, 13, and 33 can be found, for example, in the specification at page 1, lines 7-8, page 3, lines 16-17, page 4, lines 10-11 and 18-19, and in claims 1, 13 and 33 as originally filed. The amendments to claims to 34, 35, 59, and 60 are merely to correct an error in the spelling of "monoanhydrosugar." It is believed that these amendments will put the case in condition for allowance or in better form for consideration on appeal. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding rejections and that they be withdrawn.

Objections to the Specification and Claims

Applicants note that the objections to the specification have been withdrawn by the Examiner. (Paper No. 9, page 2.)

The Examiner has withdrawn the objection to claims 4, 5, and 17. (Paper No. 9, page 2.) However, the Examiner has objected to claims 16 and 18 as not dependent on the precedent claims. Applicants have cancelled claims 16 and 18 and have added new claims 63 and 64. Therefore, Applicants respectfully request that the Examiner reconsider and withdraw this objection.

Rejections under 35 U.S.C. § 112

Applicants note that the rejection of claims 4, 6, 13, 14, 16, 18, and 33 under 35 U.S.C. § 112, first paragraph, and the rejection of claims 1, 13, and 33 under 35 U.S.C. § 112, second paragraph have been withdrawn by the Examiner. (Paper No. 9, page 2.)

Rejections under 35 U.S.C. § 102

Applicants note that the rejection of claims 1-3 and 10 under 35 U.S.C. § 102 (b) as being anticipated by Hartmann has been withdrawn by the Examiner. (Paper No. 9, page 2.)

Rejections under 35 U.S.C. § 103

The Examiner rejected claims 1, 4-13, and 16-62 under 35 U.S.C. § 103 (a) as allegedly being unpatentable over Hartmann, U.S. Patent No. 3,454,603, in view of Feldmann *et al.*, U.S. Patent No. 4,564,692, and Brinegar *et al.*, PCT Publication No. WO 00/14081, for the reasons of record in Paper No. 4. (*See* Paper No. 9, page 3.) The Examiner maintained that the skilled artisan would have been motivated to incorporate the crystallization technique of Feldmann *et al.* into the Hartmann process of preparing 1,4-3,6-dianhydroglucitol in order to improve the purity of the desired compound. (*See* Paper No.

9, page 4.) The Examiner further stated that "the Brinegar et al [reference] has been used as the tertiary reference to supplement the primary reference regarding the teaching of AG50W-X12 acidic catalyst useful for producing anhydro sugar alcohols with no residue." (Paper No. 9, page 4.) Applicants respectfully traverse this rejection.

In order to make a prima facie case of obviousness, *inter alia*, there must be some suggestion or motivation in the references cited by the Examiner to combine reference teachings to obtain Applicants' invention. *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998). Applicants submit that there neither a suggestion nor any motivation for one skilled in the art would to combine the Hartmann and Feldmann *et al.* references.

The claimed invention does not require the use of an organic solvent during the reaction stage. Hartmann teaches only a simple acid catalyzed dehydration and does not teach or suggest the use of a solid acid catalyst without the need for solvent. Moreover, Feldmann *et al.* do not teach that the need for use of a solvent in the dehydration or purification steps can be eliminated. In the claimed process, solvents are not required in either the dehydration or purification steps. Furthermore, unlike Feldmann *et al.*, the claimed invention does not require a concentrated aqueous solution or seed crystals, again eliminating the need for solvent.

While the Examiner asserted that "the skilled artisan in the art would expect to improve on the purity of the desired compound by applying the Feldmann et al crystallization technique to the Hartmann process" (Paper No. 9, page 4), Hartmann teaches that "[t]he 1,4-3,6-dianhydro-D,L-glucitol [*i.e.*, isosorbide] is of such a nature that it is not readily crystallized, thus ***crystallization is not used as a method to purify 1,4-3,6-dianhydro-D,L-***

glucitol." (Col. 2, l. 71-col. 3, l. 3) (emphasis added). Thus, the teachings of Feldmann *et al.* that crystallization should be used to purify isosorbide directly contradict the teachings of Hartmann that crystallization is ***not*** to be used as a method to purify isosorbide. Since the teachings of Hartmann contradict the teachings of Feldmann *et al.*, one of ordinary skill in the art would not have been motivated to combine the teachings of the two references to develop the process of the present invention. *See W. L. Gore & Assoc. v. Garlock, Inc.*, 721 F.2d 1540, 1550 (Fed. Cir. 1983) (error to find obviousness where references "diverge from and teach away from the invention at hand").

Even assuming, *arguendo*, that one of skill in the art would have been motivated to combine Hartmann and Feldmann *et al.*, he would not have arrived at the claimed invention because he would have used solvents for both the dehydration and purification steps. As set forth above, the claimed process does not use solvents in either the dehydration or purification steps.

With respect to the Brinegar *et al.* reference, the Examiner previously stated that "it would have been obvious to the skilled artisan in the art to have [been] motivated to use the Brinegar et al AG50W-X12 as a substitute [acidic catalyst]. This is because the skilled artisan would expect to improve on the purity of the desired compound by using the AG50W-X12 catalyst in the process." (Paper No. 4, page 9). Applicants respectfully disagree.

Brinegar *et al.* teach the use of AG50W-X12 catalyst in a dehydration step that uses organic solvents. However, Brinegar *et al.* do *not* teach dehydration in the absence of solvent. As such, the Brinegar *et al.* reference fails to remedy the deficiencies of the Hartmann and Feldmann *et al.* references since it does not teach or suggest that such a catalyst could be used for dehydration without solvents as in the claimed process. Therefore,

one of ordinary skill in the art would not have been motivated to combine Brinegar *et al.* with Hartmann and Feldmann *et al.* to arrive at the *claimed invention*.

The Examiner asserted that "Feldmann et al also teaches a process of obtaining pure anhydrosugar alcohols from the reaction mixtures that have been purified by means of ion exchanges. Therefore, the Feldmann et al [reference] is relevant to the claimed invention." (Paper No. 9, page 5). Applicants respectfully disagree. As pointed out above, Feldmann *et al.* do not teach that the need for the use of a solvent in the dehydration or purification steps can be eliminated. In particular, Applicants point out that one of skill in the art would know that purification by ion exchange and/or activated carbon, as mentioned in Feldmann *et al.*, requires solvents. The purification step of the claimed process is performed without solvents. As such, Feldmann *et al.* fail to remedy the deficiencies of the cited references, and one of ordinary skill in the art, therefore, would not have arrived at the claimed invention based on Hartmann in view of Feldmann *et al.* and Brinegar *et al.*

Applicants respectfully submit that the rejection of claims 1, 4-13 and 16-62 as allegedly unpatentable over Hartmann in view of Feldmann *et al.* (U.S. Patent No. 3,454,603) and Brinegar *et al.* (WO 00/14081) has been overcome and should be withdrawn.

Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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